Parameter description - continuation

Defrosting (DEF)
d0 = Type of defrosting.
re = defrosting without connecting the compressor.
in = defrosting by connecting the compressor.
d1 = End of defrosting temperature.
When this temperature is reached the defrosting will end.
d2 = Maximum defrosting time.
The defrosting will stop when this time is reached.
If it is zero there will be no defrosting.
d3 = first Hour defrosting of the day
From 00:00 hours the first defrosting is at d3 hours.
Until this time no defrosting is performed
d4 = Delay first defrosting.
Time to carry out the first defrosting if d3 = yes.
d5 = Display during the defrosting.
Off = The curren temperature will be shown during defrosting.
On = The temperature at defrost beginning is frozen on display until the end of defrosting and until the current temperature is equal or lower than the initial one, or until d6 time elapses.
def = Label -d- is displayed during defrosting, until the end of defrosting and until the current temperature is equal or lower than the initial one, or until d6 time elapses.
d6 = Display return limit.
Maximum time before viewing the current temperature again after defrosting.
d7 = Compressor drip time.
Time since defrosting ends until the compressor can be connected.
d8 = Interval between defrosting.
Time between the start of a defrosting and the start of the following one.
If it is zero defrosting is not done automatically by time.
d9 = Fan operation during defrosting time.
It determines if the fan is connected or not during defrosting.
d10 = Fan drip time.
Time since defrosting ends until fan can be connected.
d11 = Minimum Time duration defrosting
Once defrosting begins it stays at least during this time
d12 = Fan & defrosting control probe.
sd1 = ambient probe.
sd2 = defrosting probe
sd3 = product probe
d14 = Units to count the defrosting cyle.
rt = according to the time of working of the controller.
ct = according to the time of working of the compressor.

PROBES (Pro)
P0 = ºC or ºF, Temperature scale
P1 = Ambient probe calibration
Degrees shift of the ambient probe.
P2 = Defrosting probe calibration
Degrees shift of the defrosting probe.
P3 = Product probe calibration
Degrees shift of the product probe.
P4 = Decimal point
P5=Probe to be viewed normally on the display.
sd1 = ambient probe.
sd2 = defrosting probe.
sd3 = product probe
P6 = Probe 2 Defrosting present.
If there is a probe 2 conected to thermostat
P7 = Probe 3 Product present.
If there is a probe 3 conected to thermostat

ALARMS(ALA)
A0 = Fan & alarm differential.
This is the temperature difference between the on and off cycle of the alarms and fan
A1 = Maximum alarm.
High alarm ON at Set+A1. High alarm OFF at Set+A1-A0.
A2 = Minimum alarm.
Low alarm ON at Set-A2. Low alarm OFF at Set-A2+A0.
A3 = Alarm exclusion time after continuous cycle.
During the continuous cycle, and this time after it, temperature alarms will be ignored.
A4 = Alarm exclusion time after defrosting.
During the defrosting and this time after it, temperature alarms will be ignored.
A5 = Alarm exclusion time after opening the door.
While the door is open (if A5>0) and time A5 after closing it, alarms will be ignored.
A6 = Alarm exclusion after connection.
Until this time has elapsed since the connection, temperature alarms will be ignored.
A7 = Temperature alarm time validation.
Time since the alarm situation occurs, until it is given.
A8 = Probe Alarm.
sd1 = ambient probe
sd2 = defrosting probe
sd3 = product probe

INICIALIZATION(INI)
Hor = Hour
Min = Minutes
E0 = Digital input configuration.
Off = Digital input disabled.
Al = External alarm. There is an alarm if input is short-circuited.
In = Door open if input is short-circuited.
def = Order to initiate a defrost if input is short-circuited.
ndf = No defrosting will be made if input is short-circuited.
H0 = Factory Configuration. Record Factory Configuration.
H1 = Master/Slave
H1=Master. The thermostat issues defrosting orders to slave connected thermostats through the digital input
H1=Slave. The thermostat performs defrosting ordered by the master connected to its digital input.
In both cases the input must be Eo=def
H2 = Keyboard protection.
Yes =Keyboard protected. To modify Set, activate/de-activate defrosting and activate/de-activate continuous cycle we have to enter the code and then quit. The protection is romeved momentarily. It is activated again 1 minute after the last key is pressed.
No = Keyboard not protected.
H3 = Delay time on connecting.
Until this time has elapsed since turning-on power, the compressor will not start-up.
H4 = Address for serial communication.
H5 = Input code to parameters.
This code is set to 00 from factory.
H6 = Type of Probe
PTC or NTC
H7 = Configuration 2 Relay and H8 = Configuration Relay 3
We can choose that it is Light (Lih), Fan (Fan), Alarm (ALA) or Defrosting (dEF)
H9 = Configuration Relay 4 (Single KLT43)
We can choose that it is Light (Lih), Fan (Fan), Alarm (ALA), Defrosting (dEF) or second compressor (Con)

HdE = Hours(HdE):Minutes(MdE) the defrost will begin at
MdE = Hours(HdE):Minutes(MdE) the defrost will begin at

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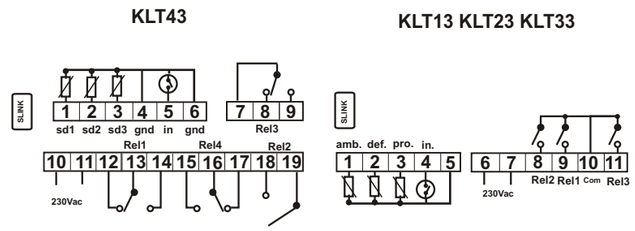
ELECTRÓNICA KELD

KLTX3
Temperature Controllers

Specification and Operating Instructions

Wiring Diagram



Description

The KLT13I, KLT23I , KLT33I and KLT43I series are electronic temperature controllers for cold refrigeration units.
These devices allow to control the Compresor, Defrost, Fan, Alarm and Light, and have up to 3 probes. The KLT43I series includes the possibility of two compressors.
NTC or PTC probes can be selected by parameter. They have also a configurable digital input according to parameter E0
These thermostats allow the Master/Slave configuration to synchronize the defrost between different thermostats.
Errors and alarms can be viewed on display.
HACCP option can record temperature, time of temperature alarms and power fails.
The Slink multifunction input allows an easy programming of the parameters with a KLKEY, the connection of a Real Time Clock and Memoery Module or the connection of a R485 Module Interface.

Model references
The model reference is given by: KLTX3I -DVYZ
Each sufix can take the following values:

V	Color:	R:Red, G:Green, B:Blue
Y	Supply Voltage:	230:230Vac, 115:115Vac 24:24Vac/dc, 12:12Vac/dc
Z	Temp: Units:	C:ºC, F:ºF

Installation

The thermostat must be located in a place protected from vibrations, impacts, water and corrosive gases.
It will be made a 71x29mm panel cut-out to insert the thermostat (apply silicone to make it leaktight). Then the fixing clips must be fasten, sliding it onto the thermostat, until it is well secure. Do not force the screw tightening if the U-brackets are used.

Wiring

Avoid installing the cables of the probes and the digital input, in the proximity of any power cable. If the lenght of the probe cables measure is longer than 100 metres, a re-calibration adjustment must be made P1 , P2 ó P3

Maintenance

Cleaning
Clean the surface of the controller with a soft, damp cloth.
Never use abrasive detergents, petrol, alcohol or solvents.
Repairs
All the repairs must be carried out by authorised people.

Technical Data

Supply voltages	115Vac+/-10%, 230Vac+/-10% 12Vac/dc +/-10%, 24Vac/dc +/-10%
Supply powers	3.6VA (230V) 1.5VA (12V)
Storage temperature	-20ºC to 80ºC (-4 to 176ºF)
Operating temperature	0ºC to 65ºC (32 to 149ºF)
Temperature probe	PTC / NTC
Probe range	PTC -50ºC to 150ºC (-58 to 302ºF) NTC -50ºC to 110ºC (-58 to 230ºF)
Temperature accuracy	Better than 1% of full scale
Temperature resolution	0.1º PTC , 1º NTC
Displays	3-digit and sign
SLINK	For KLKEY or Real Time Clock and Memory Module or Communication Module

Outputs

KLT43 Model

REL 1	SPDT Relé Carga Resistiva 16A 1HP 240Vac -- 10FLA, 60LRA 240Vac
REL 4	SPDT Relé Carga Resistiva 16A 1HP 240Vac -- 10FLA, 60LRA 240Vac
REL 2	SPST Relé Carga Resistiva 8A 240Vac
REL 3	SPDT Relé Carga Resistiva 8A 240Vac

KLT13,KLT23,KLT33 Models

REL 1	SPST Relé Carga Resistiva 16A 1HP 240Vac -- 10FLA, 60LRA 240Vac
REL 2	SPST relay resistive load 5A 240Vac
REL 3	SPST Relé Carga Resistiva 8A 240Vac

Dimensions	77 x 36 x 62 mm (3.03 x 1.42 x 2.44 in)
Front Protection	IP64

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ETDT1412I_090318

Front Operation

Set Point Setup
- Press key SET. The Set label appears.
- Press SET again. Current set point value appears blinking.
- Press UP or DOWN to increase or decrease the value.
- Press SET to confirm the new value.
- Press SET and DOWN to exit

Time pogramming
- Press key SET. The Set label appears.
- Press UP or DOWN to go to Hour or Minute
- Press SET to see the value.
- With UP and DOWN set the desired new value.
- Press SET for 8 seconds, Pro will appear on the display once the time has been correctly programmed
-Press SET + DOWN to quit or wait for 1 minute (keyboard timeout).

Parameter programming

- The parameters are grouped in the menus COM, DEF, PRO, ALA, INI

- Press SET for 8 seconds. Value 00 appears blinking.
- Set the code with UP and DOWN (it is set to 00 from factory).
- Press SET to confirm the code. If it is right, the label of the first menu will appear.
- With UP and DOWN go to the desired menu.
- Press SET, the label of the first parameter of menu will appear.
- With UP and DOWN go to the desired parameter label of the list of parameters.
- Press SET to see the value.
- With UP and DOWN set the desired new value.
- Press SET to confirm it and exit to the parameter label.
-Press SET + DOWN to go to menu list.

-Press SET + DOWN to quit programming or wait 1 minute (keyboard timeout).

To record a standard configuration

- Access to parameter H0 as explained in Parameter programming.
- Choose desired configuration.
For series KLT13I-Dx: H0 is set to 0
For series KLT23I-Dx: H0 is set to 1
For series KLT33I-Dx: H0 is set to 2
For series KLT33I-Dx: H0 is set to 3
- Press SET for 8 seconds, and the thermostat will be reset.
-Press SET + DOWN to quit or wait for 1 minute (keyboard timeout).

Manual Defrost.
Pressing UP key for 8 seconds defrost is activated. Repeating the operation is deactivated.

Continuous cold cycle.
Pressing DOWN key for 8 seconds a continuous cold cycle begins. Repeating the operation the cycle finalizes.

Setting keyboard code to zero
The keyboard code can be programmed to zero by turning off the controller, and turning it on again, while the key SET is pressed.

Alarm validation
An active alarm can be validated (the alarm output will be turned off) pressing the SET and DOWN keys simultaneously.

Led Indications

Out: It indicates Compresor connected. It blinks when a continuous cold cycle has to be initiated and has to wait until the minimum compressor stoppage time is over.

Def: It indicates defrosting is activated.
Fan: It indicates ventilator is connected.
Alarm: It indicates an error or alarm. It blinks when the alarm is validated by the user.

Display Messages
In normal operation the probe temperature selected by P5 will be displayed. The following messages can also appear :
- **Err** Memory reading error.
- **ErP1, ErP2, ErP3** Probe1 , 2 or 3 error
- **Eri** Internal parameter error. In this case, enter the standard configuration, as it is indicated in "To record a standard configuration".

- **ALH** High temperature alarm.
- **ALL** Low temperature alarm.
- **ALE** External alarm.
- **AEH** High temperature and external alarm.
- **AEL** Low temperature and external alarm.
- **ooo** Open probe.
- **---** Short-circuited probe.
- **DON** Defrosting activated.
- **DOF** Defrosting de-activated or cannot be done.
- **CON** Continuous cold cycle activated.
- **COF** Continuous cold cycle de-activated or cannot be done.
- **-d-** Thermostat on defrosting.

To view the probe not chosen by P5, press SET+UP

The display blinks when there is an error recording a parameter in memory or when awaiting confirmation of a value.

Operation in Error Case

If the ambient probe fails, the thermostat will connect the compressor according to parameters c2 and c3, being able to perform defrosting and continuous cold cycles.

If the memory fails the thermostat will connect the compressor ON for 5 minutes and OFF for 5 minutes, not being able to perform defrosting or continuous cold cycles.

Two Compressors Operation

In this case, when the thermostat demands cold (Sd1 >= Set+r0) the first compressor to be connected is the compressor with less running hours, and after c6 seconds, the second compressor is also connected. When the thermostat begins to cool, and Sd1<Set+r0/2 is reached, the second compressor stops, and the first one continues. The second will be stopped when Sd1<Set. Nevertheless, if before stopping the first compressor, Sd1 >= Set+r0, the second compressor starts running again.

HACCP

If this option is activated, the thermostat registers up to 5 alarms of the types Hight, Low, and blackout. These alarms can be seen in the menu Registry of Alarms (HAC). To acced to this menu, proceed as for the parameters menu.

The first value that appears is the number of registered alarms. Afterwards, for each alarm (if it has existed), the value of the temperature and the time of the alarm. For the disconnection alarm, the temperature when returning the connection is registered, as well as the time until the correct values are reached. (Probe<Set+A1-A0)

When the elapsed time is showed it will appear xxd (days).Pressing UP xxH (Hours) will be shown, and pressing UP again, xxn (Minutes) will be displayed. When located over a temperature of alarm or time, pressing UP+DOWN during 2 seconds, both recorded data of the alarm (time and temperature value) are deleted.

In the Ald menu, and pressing UP+DOWN keys during 2 seconds, all the recorded data of alarms are deleted.

SLINK

In this input we can connect a programming key to read or to write the parameters. We can also connect a clock module so that the hour of the thermostat goes with a realtime clock. If we manage the system with a PC we can connect it to the thermostat through this input with a communication module.

List of parameters

Con	Description	Units	Range	Factory
Set	Set point	Degrees	r1 to r2	3.0
r0	Differential or hysteresis	Degrees	0,1 to 20	1.0
r1	Minimum value for set point	Degrees	-99,9 to r2	-50.0
r2	Maximum value for set point	Degrees	r1 to 302	150
r6	Fan operation	Range	off /on /con	con
F0	Fan stoppage temperature	Degrees	-99.9 to 302	28.0
F1	Fan works with door open	Option	no/yes	yes
c0	Minimum compressor stoppage time	Minutes	0 to 240	1
c1	Continous cycle time	h - m	0.0 to 18	1.0
c2	ON time of fault cycle	Minutes	0 to 999	5
c3	OFF time of fault cycle	Minutes	0 to 999	5
c4	Minimum ON time of the compressor	Minutes	0 to 240	0
c5	Minimum time between two connections of the compressor	Minutes	0 to 240	1
c6	Delay time for second compresor	Minutes	0 to 240	30

dEF	Description	Units	Range	Factory
d0	Type of defrosting	Range	re /in	re
d1	Temperature at which defrosting will stop	Degrees	-99.9 to 302	80.0
d2	Maximum defrosting time	Minutes	0 to 240	30
d3	First Hour of Day for Defrosting	h-m	00,0 to 18,0	00.0
d4	Delay of first defrosting	Minutes	0 to 999	0
d5	Display on defrosting	Range	off/on/-d-	
d6	Display return limit.	Minutes	0 to 240	15
d7	Compressor drip time.	Minutes	0 to 240	0
d8	Interval between defrostings.	h - m	00,0 to 18,0	8.0
d9	Fan works on defrosting.	Range	no/yes	no
d10	Fan drip time	Minutes	0 to 240	0
d11	Minimun Defrosting time	Minutes	0 to 240	0
d12	Fan/defrosting control probe	Range	sd1/sd2/sd3	sd2
d14	Units to count the defrosting Cycle	Option	rt / ct	rt

Pro	Description	Units	Range	Factory
P0	Temperature scale	Option	ºC/ºF	ºC
P1	Ambient probe 1 calibration	Degrees	-20,0 to 20,0	0.0
P2	Defrosting probe 2 calibration	Degrees	-20,0 to 20,0	0.0
P3	Product probe 3 calibration	Degrees	-20,0 to 20,0	0.0
P4	Decimal point	Option	no/yes	no
P5	Probe to display	Range	sd1/sd2/sd3	sd1
P6	Probe 2 present	Option	no/yes	yes
P7	Probe 3 present	Option	no/yes	no

ALA	Description	Units	Range	Factory
A0	Fan and alarm differential	Degrees	0.1 to 20.0	4.0
A1	Maximum alarm temperature (1)	Degrees	0.1 to 99.9	8.0
A2	Minimum alarm temperature (1)	Degrees	0.1 to 99.9	8.0
A3	Time without alarm after continous cycle	h - m	0.0 to 18.0	1.1
A4	Time without alarm after defrosting	h - m	0.0 to 18.0	1.1
A5	Time without alarm after opening the door	h - m	0.0 to 18.0	1.1
A6	Time without alarm after connection	h - m	0.0 to 18.0	1.1
A7	Alarm verification time	h - m	0.0 to 18.0	1.1
A8	Probe for alarm	Range	sd1/sd2/sd3	sd1

Ini	Description	Units	Range	Factory
Hor	Hour	Hours	0..23 0	
Min	Minutes	Minutes	00..59	0
E0	Configure digital input	Range	off/Al/In/def	def
H0	Factory Settings	Range	0 to 3	
H1	Master/Slave	Range	Mst/Slv	MSt
H2	Keypad protection	Option	no/yes	no
H3	Delay time on connecting	Seconds	0 to 240	0
H4	Address for serial communication	Numeric	0 to 999	0
H5	Keyboard code	Numeric	0 to 999	0
H6	Type of probe	Option	ptc / ntc	ptc
H7	Relay 2 Setup	Option	Lit/FAn/ALA/dEF	dEF
H8	Relay 3 Setup	Option	Lit/FAn/ALA/dEF	dEF
H9	Relay 4 Setup	Option	Lit/FAn/ALA/dEF/Con	Con
H10	HACCP Activated	Option	no/yes	no
HdE	Next defrost Time	Hours	(only read)	
MdE	Next defrost Time	Minutes	(only read)	

ON OFF Thermostat

Pressing the keys SET+DOWN for 8 seconds the thermostat will turn-on or turn-off

ON OFF Light

If we have a relay setup as light, pressing keys UP+DOWN for 3 seconds the thermostat will turn-on or turn-off the light

Defrosting Cycles

The cycles of defrosting can be performed counting total time (d14= rt) or counting the time only when the compressor is connected (d14= ct).
First defrosting will be always made at the hour d3
And the others with the cycle given by d8.

Hour/Minutes Parameters H-M

It is a way to show hours and minutes in 3 digits
The two first digits are the hours and the third the tens of minutes.
E.g.
2.4 2 hours 40 minutes
8.0 8 hours 0 minutes
10.3 10 hours 30 minutes

Parameter description

COMPRESSOR (CON)

SET = Work set point.
Temperature we wish to maintain the machine. Variable between r1 and r2.

r0 = Differential.
When ambient probe temperature >= Set+r0 Compresor ON
When ambient probe temperature <= Set Compresor OFF

r6 = Fan operation on regulation.
Off = Fan does not connect on regulation.
On = Fan is always connected on regulation.
Con= Fan linked to compressor start-up.
(Fan ON if allowed by the temperature given by F0)

F0 = Fan temperature limit.
Fan OFF on regulation when probe temperature setup in d12 is >= F0.
Fan ON on regulation, when temperature is =< F0-A0.
The operation of the fan on regulation is determined also by r6.

F1 = Fan stop if door opened.
No = The fan does not stop on regulation and continuous cycle when opening the door.
Yes = The fan stops on regulation and continuous cycle when opening the door.

c0 = Minimum compressor stop time
Minimum time since compressor stops until it is starts again.

c1 = Continuous cycle time.
Duration of a continuous cold cycle.

c2 = ON time of fault cycle, when ambient probe is broken

c3 = OFF time of fault cycle, when ambient probe is broken

c4 = Minimum time of working of the compressor
Minimum time since compressor starts until it stops.

c5 = Minimum time between two connections of the compressor
Minimum time since compressor starts until it starts again.

c6 = Delay Time 2 Compressor
Time since compressor 1 is connected until compressor 2 is connected, if it is necessary to connect it and if H7=Com